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Sutherland

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[54] **ADJUSTABLE BARBELL EXERCISE RACK**

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[51] **Int. Cl.**[4] **A63B 13/00**

[52] **U.S. Cl.** ..... **272/123;** 272/134; 272/DIG. 4; 254/2 B; 269/296

[58] **Field of Search** ..... 272/93, 123, 134, DIG 4, 272/117; 248/554, 659, 671, 67.7, 73, 129, 422, 424; 254/2 B; 280/47.28; 269/296, 900, 902, 43, 17

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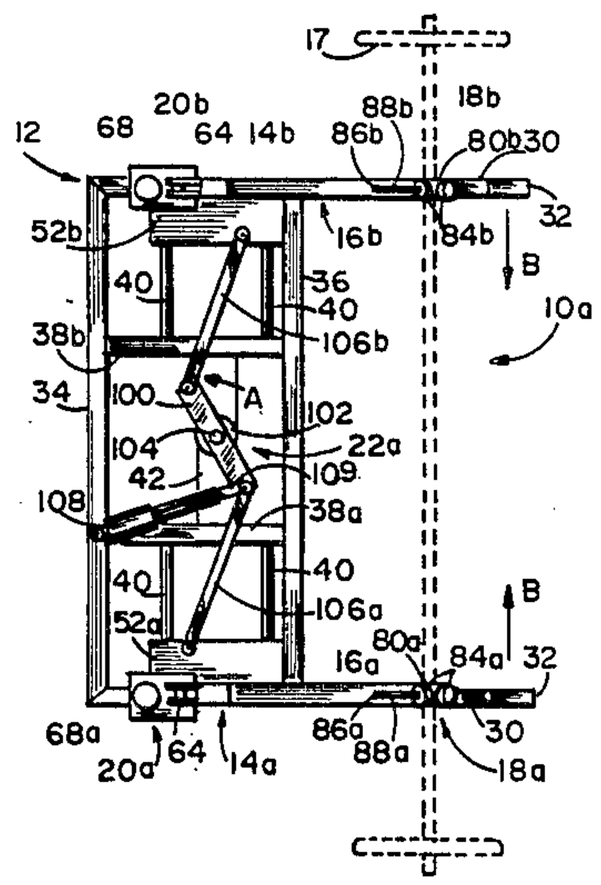
[57] **ABSTRACT**

A barbell exercise rack that includes a support base with a support stand upstanding therefrom to which are secured a pair of cantilever support arms. Each arm has a rack which holds the barbell while allowing the barbell to be lifted therefrom. The cantilever arms are mounted so that the outer ends are adjustable to be selectively converged and diverged in order to adjust the racks to various weight lifters. Preferably the height of the cantilever arms is also adjustable while the stand may include either one or two upright support elements.

16 Claims, 8 Drawing Figures



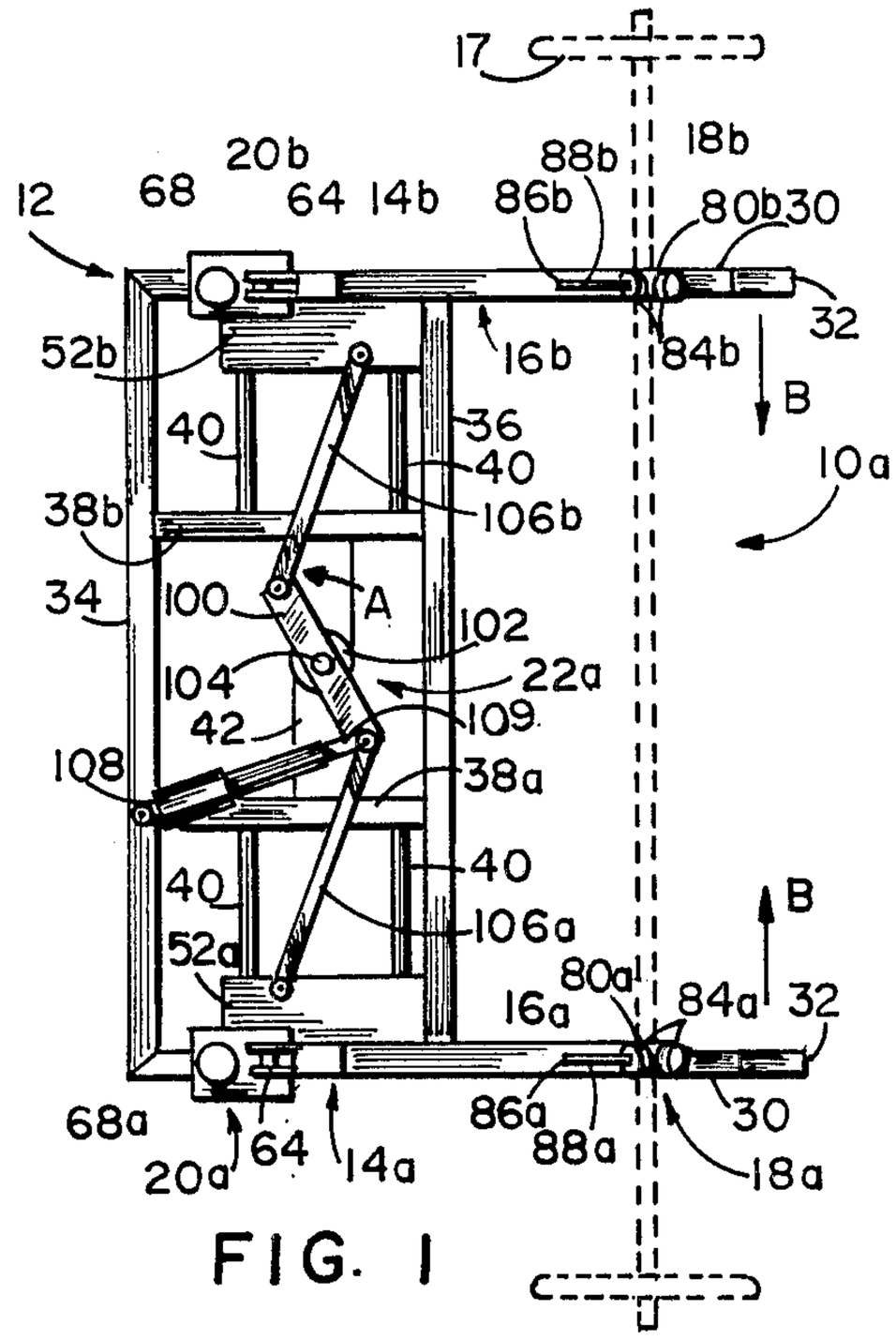


FIG. 1

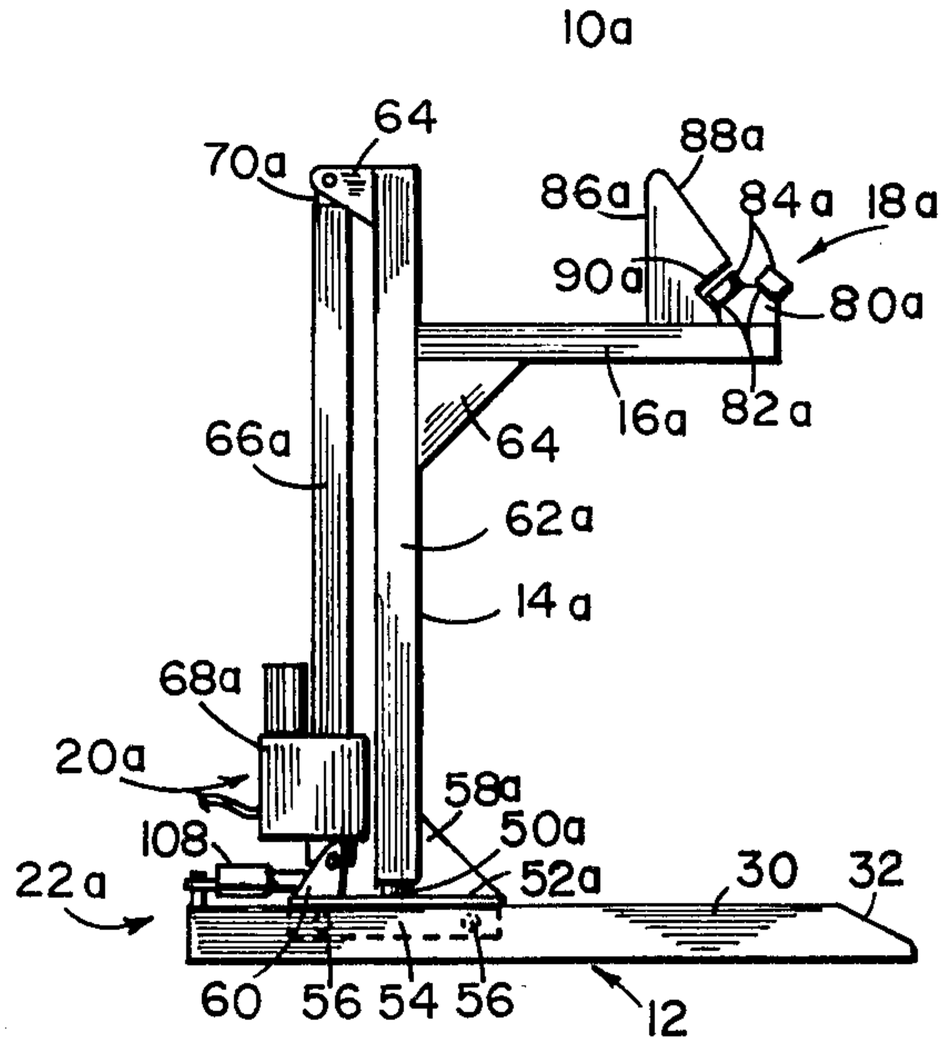


FIG. 2

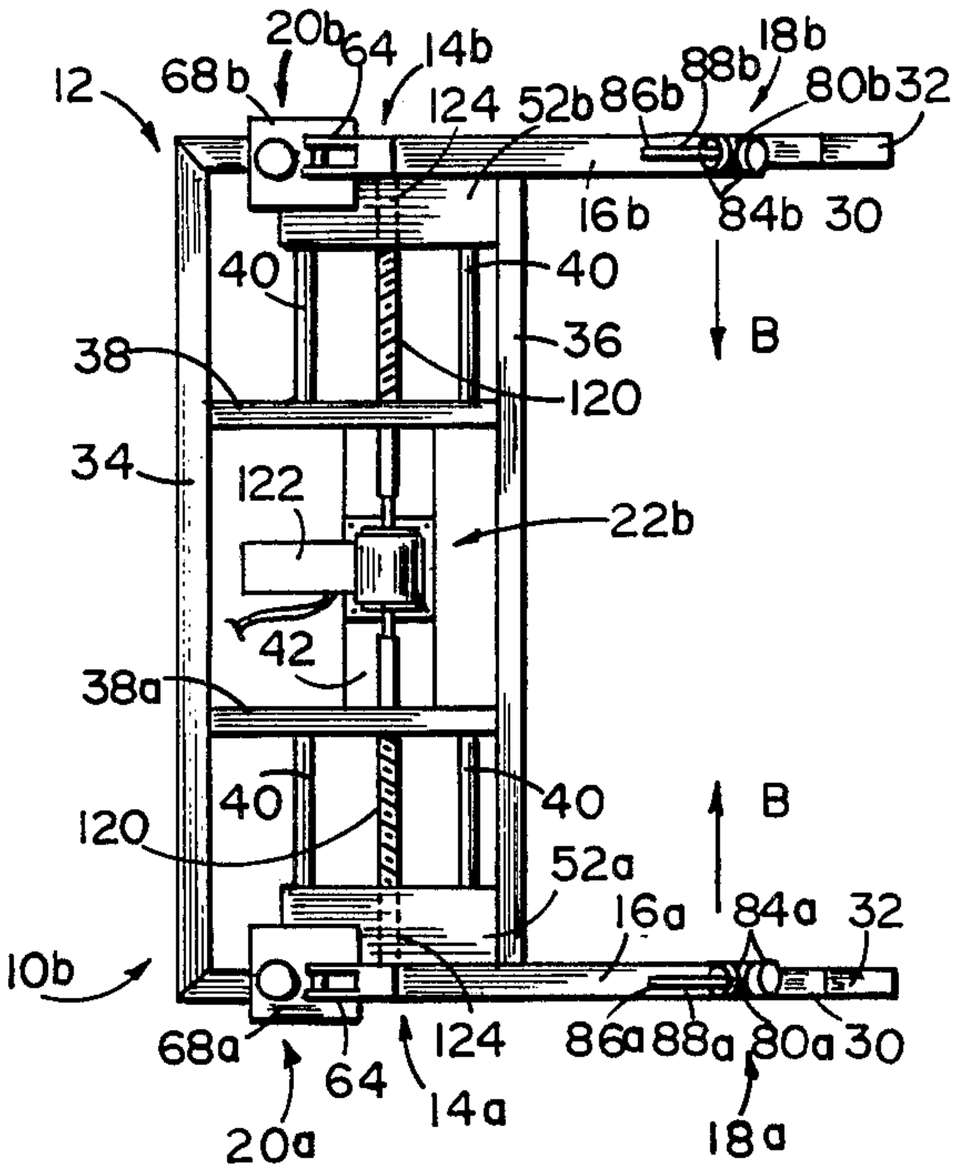


FIG. 4

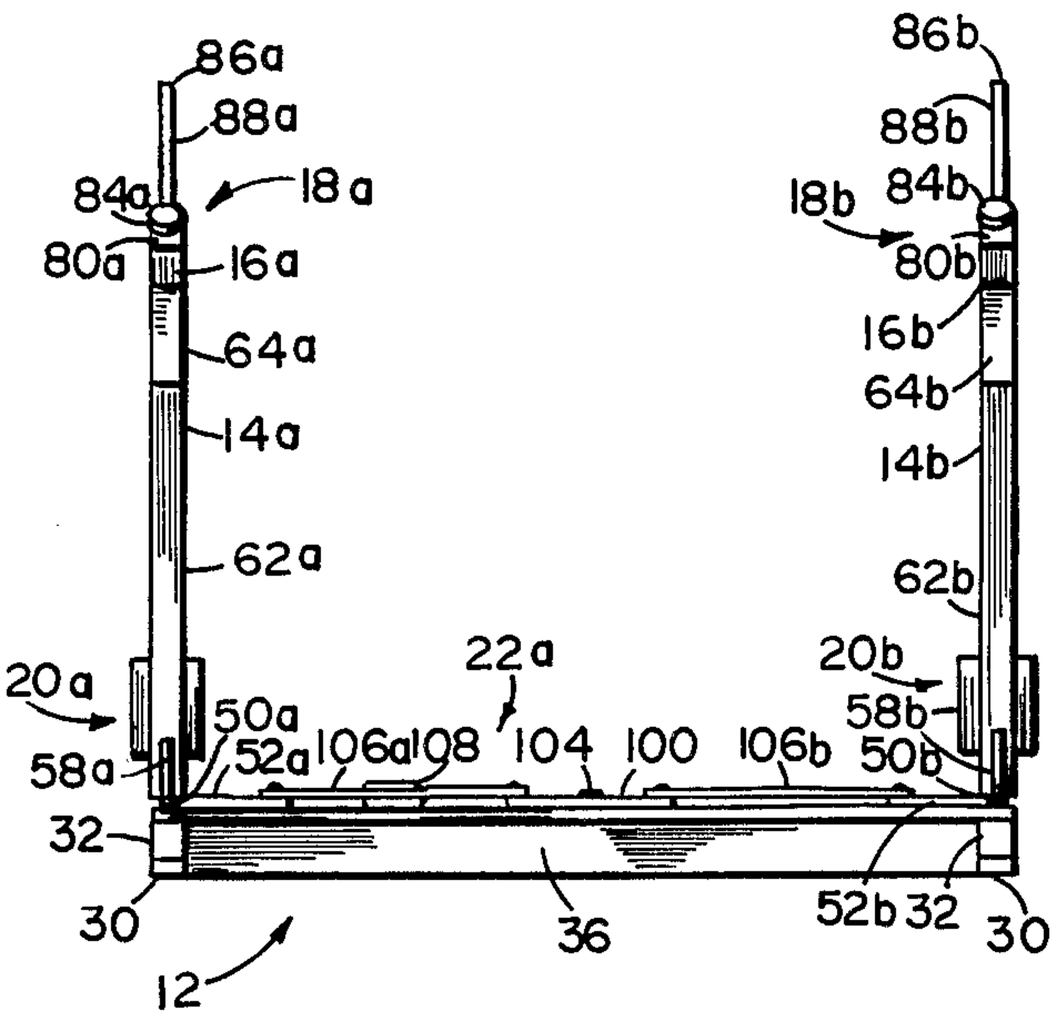


FIG. 3

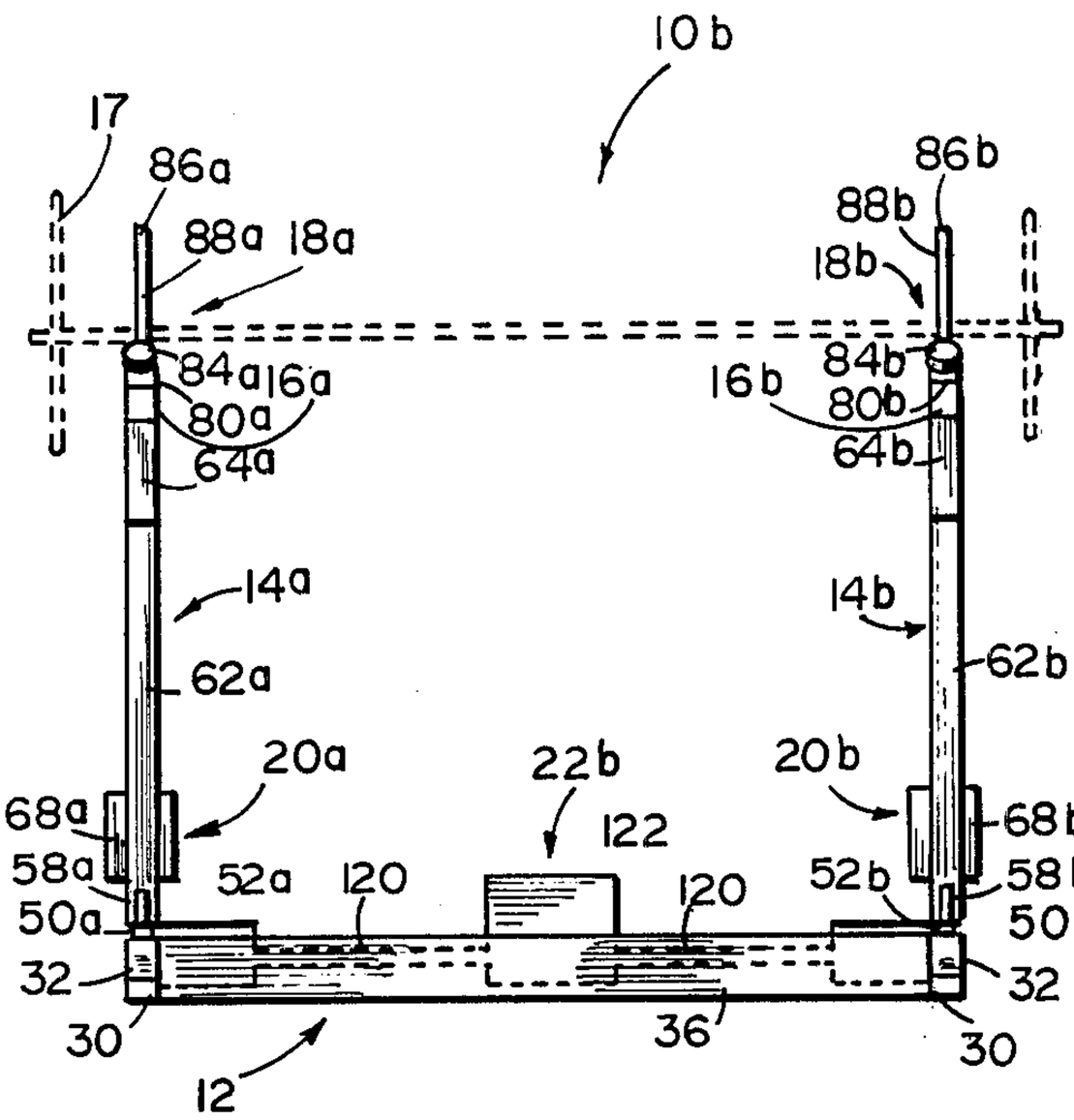


FIG. 5

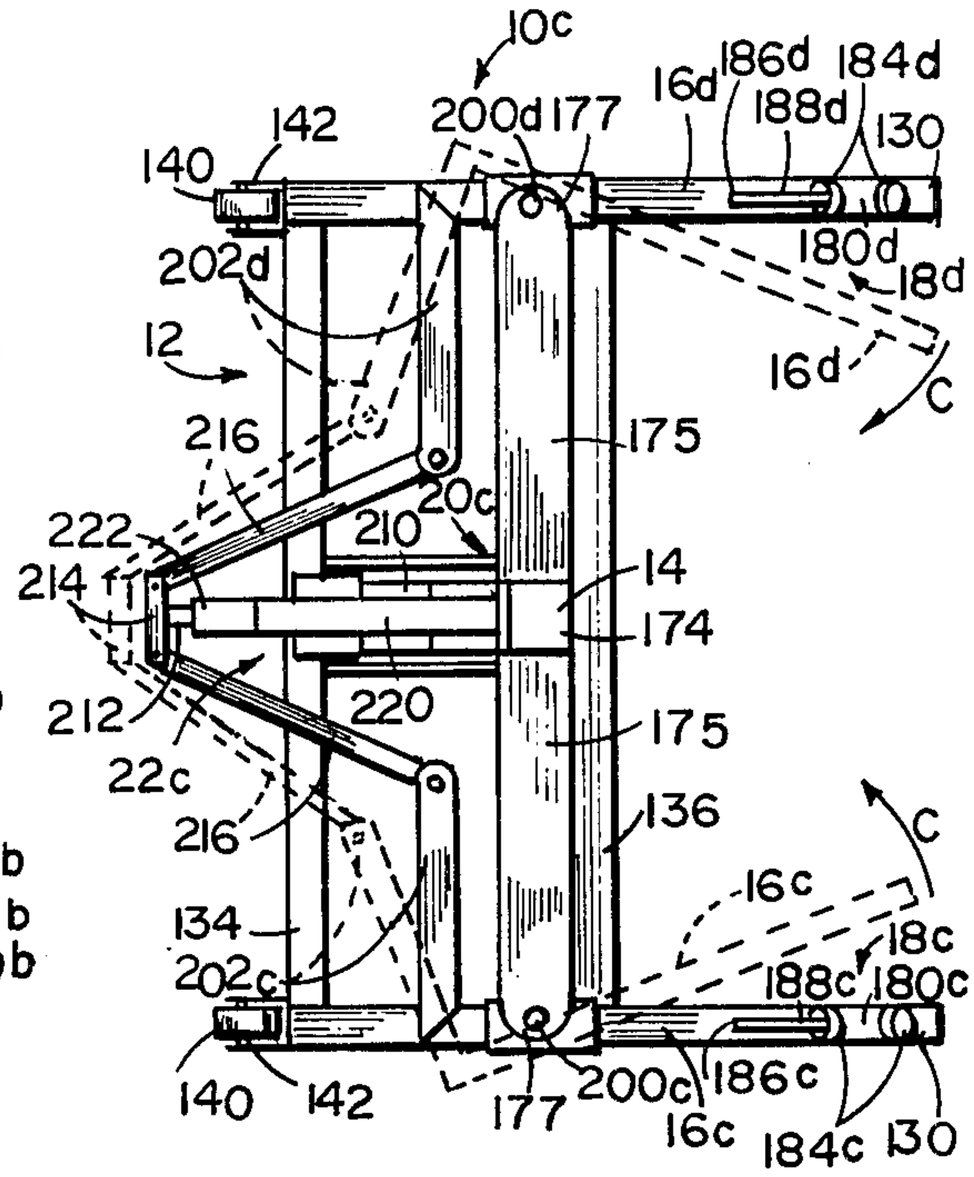


FIG. 6

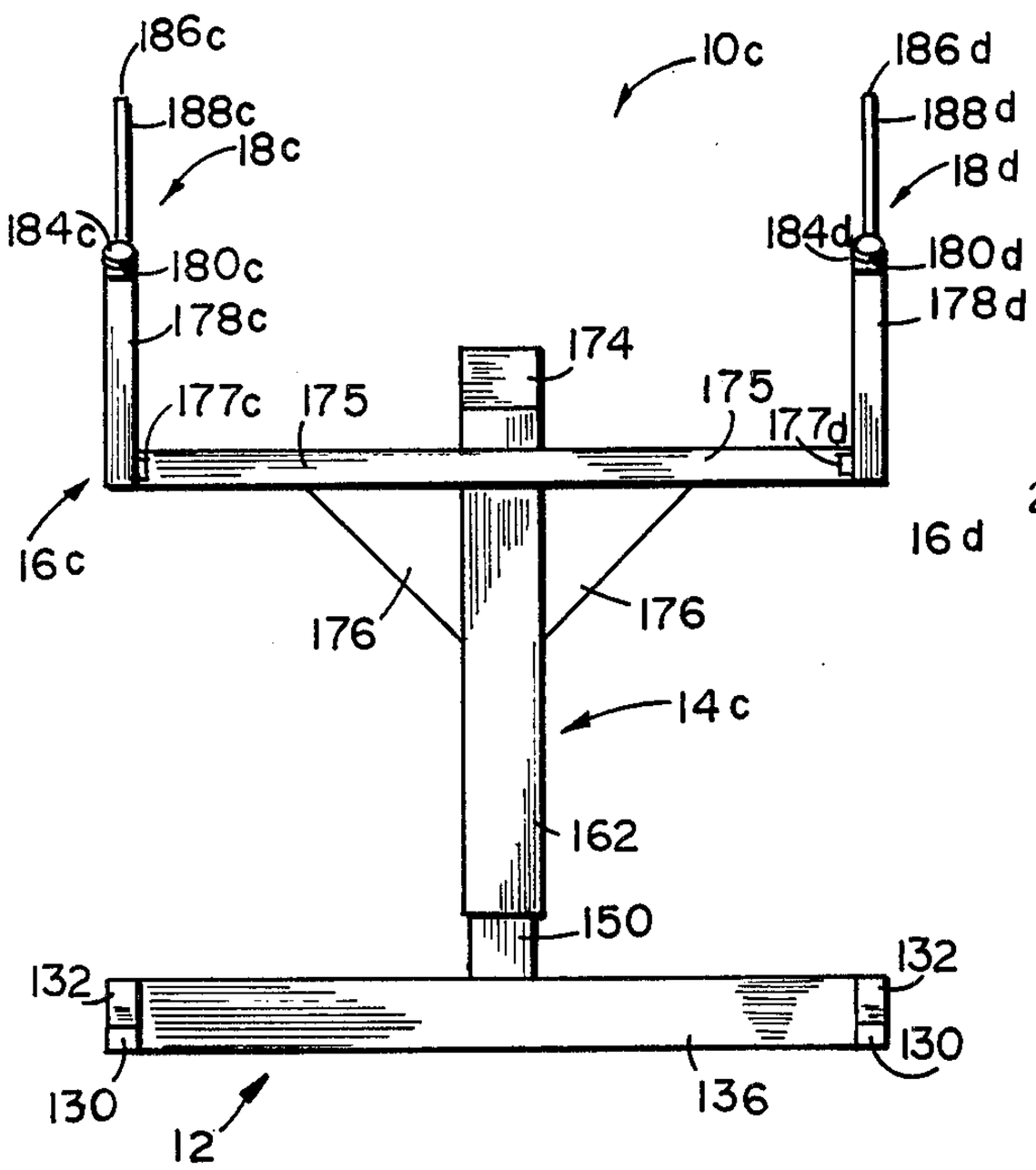


FIG. 8

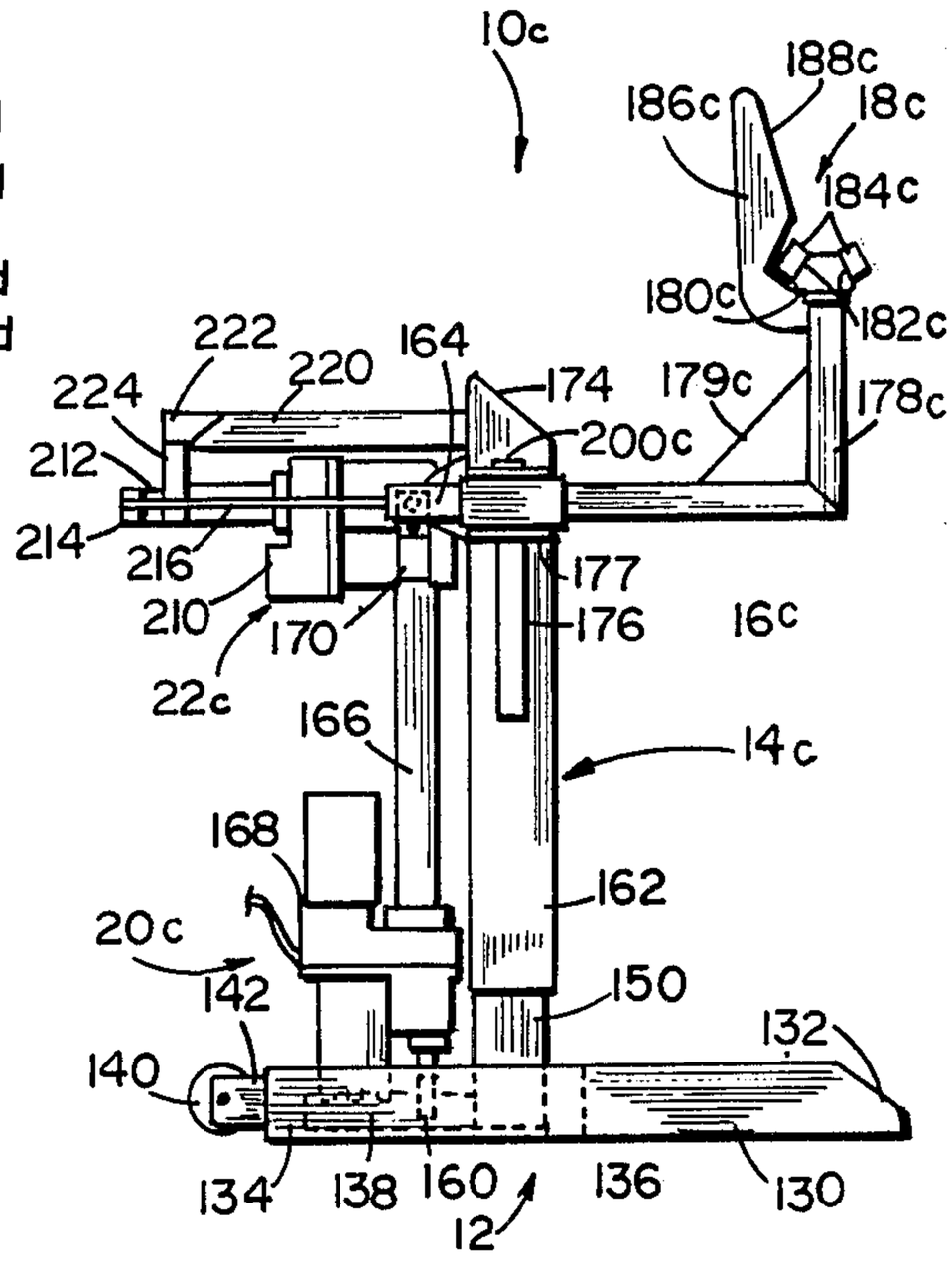


FIG. 7

ADJUSTABLE BARBELL EXERCISE RACK

BACKGROUND OF THE INVENTION

The present invention relates to barbell racks, and in particular to adjustable barbell racks, such as are used for squat lift exercises.

Weight lifters perform a variety of exercises in order to develop various different muscles associated with each exercise. One type of exercise involves the weight lifter squatting down in order to position himself under a barbell, and lifting the weight on his shoulders. Such exercises develop the leg and back muscles in particular, and are normally performed with the barbell initially resting upon a supporting exercise rack. The exercise rack holds the barbell on two, laterally spaced apart racks while the weight lifter positions himself between these racks in order to lift the barbell. The adjustment of the exercise rack is dependent upon the particular type of exercise to be performed, and the physique of the particular weight lifter. The two support racks may be required to be shifted laterally so that the weight lifter may vary the placement of his hands upon the supported barbell. It may also be necessary to vary the height of the initial position of the barbell in order to accommodate weight lifters of different heights, or to permit different exercises to be performed.

Problems encountered with the adjustment of such exercise racks are particularly troublesome during competitive events. During such events, numerous weight lifters make use of the same exercise rack, and delays in adjusting the rack slow down the competition. These delays have a deleterious effect upon the spectator appeal of the sport. Further, during many competitive events, a weight lifter has only a fixed amount of time in which to commence a lift, and therefore has a very limited amount of time in which to alter the rack position, if at all. During such competitive events proper rack adjustment has a psychological effect upon some weight lifters' performance, as well as actually physically effecting the weight lifter's ability. Therefore, an exercise rack that is quickly and accurately adjustable is highly desirable.

Heretofore, most exercise racks have made use of two separate stands as a pair of vertical supports, each of which includes a cradle or rack to hold the barbell. The stands must be separately positioned, and usually include a weighted base that prevents the rack from tipping over. Although the weighted base is necessary for the stability of the rack, the weighted base also makes it difficult to change the spacing of the barbell supporting cradles. Normally, the barbell supported by the racks must be manually removed prior to adjustment of the cradle spacing, thereby further delaying the competition.

Exercise racks of the type described above usually include some mechanism for adjusting the height of the cradles, and thus the height of the supported barbell. Often these height adjustment devices must be independently adjusted in order to adjust the height of each individual vertical support. Many existing vertically adjustable exercise racks include telescoping vertical supports that must be manually lifted. Therefore, such exercise racks require that the supported barbell be removed prior to adjustment, the racks be individually adjusted by hand and then the barbell replaced on the racks. All of these separate adjustment activities reduce the speed and ease of rack adjustment. In one existing exercise rack, two vertical supports are each provided with a manual jack for raising the rack height, which is similar to those used with automobiles. Although this rack is an improvement over racks which must be manually lifted, with this exercise rack, two people are still required to simultaneously jack up the cradles if the barbell was not removed prior to adjustment to make sure that the barbell does not slide off of the racks.

SUMMARY OF THE INVENTION

The present invention is embodied in a barbell exercise rack that includes a support base with an upstanding, generally vertical support stand. A pair of support arms, which each have racks at their outer ends, are connected in cantilever fashion to the support stand. The arms are spaced apart, and are laterally adjustable in order to accommodate the different gripping techniques of various weight lifters when they position themselves between the racks at the outer ends of the cantilever arms. Preferably, the arms are also simultaneously vertically adjustable to facilitate weight lifters of all different heights.

In another aspect of the invention, the support base includes a pair of uprights, each of which have a rack connected therewith that supports the barbell. The uprights are adjustably interlinked in order to adjust the spacing of the racks and the adjustment mechanism is located within the support base so that the area above the base between the uprights is substantially unobstructed, such that the weight lifter will not injure himself in the event that he is overcome by the weight of the barbell.

With the device of the present invention, the exercise rack can be quickly and easily adjusted to accommodate various weight lifters. The arms can be simultaneously laterally adjusted while the barbell remains on the device so that the weight lifter may himself make the adjustment. Similarly, the height of the barbell rack can be adjusted while the barbell remains supported thereon so that the height can be instantly adjusted as the weight lifter requires. The present invention therefore permits last minute adjustments to be made by the weight lifter during competition. Since the arms are cantilevered, the barbell is held away from the support stand so that interference with the weight lifter by the remainder of the exercise rack is avoided, both while positioning himself and while lifting the weight.

These and other features, advantages, and objects of the present invention will be further understood and appreciated by those skilled in the art by reference to the following written specification, claims, and appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top, plan view of a barbell exercise rack embodying the present invention;

FIG. **2** is a side elevational view of the exercise rack of FIG. **1**;

FIG. **3** is a front elevational view of the exercise rack of FIG. **1**;

FIG. **4** is a top, plan view of a barbell exercise rack embodying a second embodiment of the present invention;

FIG. **5** is a front elevational view of the exercise rack of FIG. **4**;

FIG. **6** is a top, plan view of a barbell rack embodying a third embodiment of the present invention, with a

laterally adjusted position of the cantilever arms shown in phantom.

FIG. 7 is a side elevational view of the exercise rack of FIG. 6;

FIG. 8 is a front elevational view of the exercise rack of FIG. 6.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the preferred embodiments, shown in FIGS. 1–8, a barbell exercise rack **10** includes a support base **12** from which extends a generally upright support stand **14**. A pair of cantilever arms **16** extend from support stand **14** and are laterally spaced sufficiently so that a weight lifter may position himself between arms **16** while lifting a barbell **17** supported by arms **16**. Located at the free ends of arms **16** are barbell racks **18**, which support the barbell **17** but which permit the weight lifter to remove the barbell weight **17**. A vertical adjustment mechanism **20** provides a means by which the height of cantilever arms **16** may be adjusted and a horizontal adjustment mechanism **22** provides a means by which the lateral spacing between cantilever arms **16** may be adjusted. The barbell exercise rack **10** may therefore be adjusted to accommodate various weight lifters and to permit a variety of weight lifting grips.

EMBODIMENT OF FIGS. 1–3

In the embodiment shown in FIGS. **1–3**, barbell exercise rack **10***a* includes support base **12** that has a pair of laterally spaced, parallel legs or floor runners **30** that lie flat on the floor surface. Runners **30** are rectangular bars having partially tapered front ends **32**. Runners **30** are spaced sufficiently that a weight lifter can stand therebetween in a variety of weight lifting stances without interference from runners **30**. The rear ends of runners **30** are rigidly joined by cross bar **34**, FIG. **1**, which also lies on the floor surface. Intermediate cross bar **34** and tapered ends **32** is another cross bar **36** that rigidly joins runners **30** and also rests on the floor surface. Joining cross bars **34** and **36** are two brackets or braces **38** that divide the area between cross bars **34** and **36** into three quadrants, the two outer quadrants being the same size and slightly smaller than the middle quadrant. Extending parallel to cross bars **34** and **36** between each floor runner **30** and the adjacent bracket **38** are a pair of guide rods **40**, each having a circular cross sectional area. Guide rods **40** are used with horizontal adjustment mechanism **22** in order to adjust the spacing of barbell racks **18**. Spanning between brackets **38** is an elongated, rectangular pivot support plate **42** which is also used with guide rods **40** to horizontally adjust barbell racks **18** as explained in detail below. Floor runners **30**, cross bars **34** and **36**, and brackets **38** are all made of one and a half by three inch, eleven gauge rectangular tubing sections which are welded together. Guide rods **40** are each a hardened steel rod one inch in diameter.

As shown in FIGS. **1** and **3**, exercise rack **10***a* includes two separate support stands **14***a* and **14***b*, each associated with a separate cantilever arm **16***a* and **16***b*, respectively. As the two support stand-cantilever arm assemblies are identical mirror images of each other, a single description of support stand-cantilever arm assembly **14**, **16** is set forth below.

As shown in FIG. **2**, support stand **14** includes a rectangular post **50** that extends as a vertical upright from a rectangular slide plate **52**. Depending from the underside of slide plate **52** is a track guide **54** that includes two spaced, circular channels **56** which slidably receive guide rods **40**. Track guide **54** allows slide plate **52** to slide along guide rods **40** in order to adjust the lateral spacing of cantilever arm **16**. As shown in FIG. **3**, slide plate **52** is raised slightly above and overhangs the adjacent floor runner **30** in order to position post **50** over runner **30** when slid fully outward. Welded between the front side of post **50** and slide plate **52** is a triangular gusset **58** which rigidly reinforces post **50** in a vertical orientation. Welded to slide plate **52** behind post **50** is a motor mount bracket **60**, FIG. **2**, which is used in the mounting of vertical adjustment mechanism **20**.

Telescopingly received over post **50** is a square upright tube **62**. The channel within hollow tube **62** is sufficiently large to allow tube **62** to freely slide along post **50**, but which maintains tube **62** generally parallel to post **50** without excessive play. On the front lower end of tube **62** is a rectangular slot through which gusset **58** passes in order to permit tube **62** to be lowered to a position raised slightly out of contact with slide plate **52**. Extending to the rear, FIG. **3**, at the upper end of tube **62** is a motor bracket **64** that corresponds to lower motor bracket **60**. Vertical adjustment mechanism **20** is mounted between brackets **64** and **60**.

Vertical adjustment mechanism **20**, FIG. **2**, includes an electrically operated mechanical jack **66** that is powered by an electrical motor and gear reducer **68**. Though the jack may be any of a variety of known jacks, one such suitable jack as depicted in FIG. **2** is manufactured by the DuffNorton Company, Charlotte, NC and sold under the tradename "SUPER-PAC ELECTROMECHANICAL ACTUATOR".

Jack **66** is of conventional design and includes a rod **70**, that is slidable within casing **66** and carries at its lower end a nut (not shown) that engages an internally threaded sleeve (not shown) which is driven through gearing by electrical motor **68**. Motor **68** is controlled in a conventional manner by a suitable switch mechanism that may be operated by the weight lifter as is conventionally known to those skilled in the art. Vertical adjustment mechanism **20** therefore is operated in order to telescopingly raise or lower tube **62** on post **50** and to rigidly hold tube **62** at the desired height.

Cantilever arm **16** is connected to the front, upper portion of tube **62** so as to extend in a cantilever fashion therefrom, FIG. **2**. Welded between the underside of arm **16** and tube **62** is a gusset **64** that rigidly maintains arm **16** in a horizontal orientation. Arm **16** is otherwise unsupported along its length so that barbell rack **18** located on the outer ends of arm **16** are wholly supported in cantilever fashion and are freely accessible to the weight lifter. Both arm **16** and tube **62** are rectangular steel tubular bars two inches by one quarter inch in cross section.

As best shown in FIG. **2**, barbell rack **18** is welded onto the upper side at the outer end of arm **16**. Rack **18** includes a roller mounting block **80** having two oppositely facing beveled surfaces **82** that each form a 45° angle with the bifurcating plane therebetween. A cylindrical roller **84** is rotatably mounted along its central axis on each beveled surface **82** and are spaced so as to form a supporting surface for the bar or handle of barbell **17** rested upon rack **18**. Rollers **84** include suitable bearing surfaces to allow rollers **84** to rotate freely upon mounting block **80**. Extending upward from arm **16** immediately to the rear of the rearmost roller **84** is a generally triangular guide plate **86**. Guide plate **86** has a

top, angled side **88** and a leading edge **90** that are configured to conform to the profile of rearmost roller **84** and mounting block **80**. Angled side **88** therefore forms a straight planar guide into the supporting area between rollers **84**. Guide plate **86** assists a weight lifter in returning barbell **17** to rack **18** and prevents the barbell from being inadvertently placed on cantilever arm **16**.

As shown in FIG. **1**, horizontal adjustment mechanism **22***a* is used to converge and separate slide plates **52** in order to adjust the lateral spacing of barbell racks **18**. A pivot bar **100** is pivotally mounted by its median point to pivot support bar **42**. On pivot support plate **42** is a raised, circular bearing surface **102** that permits pivot bar **100** to pivot about its median point but which maintains pivot bar **100** parallel to the floor surface without excessive wobbling. Pivot bar **100** is mounted by a suitable pivot **104** having bearings which permit bar **100** to turn freely. A left and a right connecting rod **106***a* and **106***b* respectively, are pivotally connected to each slide plate **52** and a separate end of pivot bar **100**. Left connecting rod **106***a* is connected to slide plate **52***a* slightly forward of rearmost guide bar **40**, while right connecting rod **106***b* is connected to slide plate **52***b* slightly to the rear of forward guide rod **40**, causing pivot bar **100** to be slightly out of parallel with crossbars **34** and **36** when slide plates **52** are fully outwardly extended. Connecting rods **106** have suitable bushings to allow rods **106** to freely pivot at both slide plates **52** and pivot bar **100**. Slide plates **52** will therefore be positioned equidistant from central pivot **104** as pivot bar **100** is pivoted causing connecting rods **106** to shift slide plates **52**. An electrically operated mechanical jack **108** is pivotally connected between cross bar **34** at left bracket **38***a* and the left end of pivot bar **100**. Jack **108** includes telescoping rod **109** and is pivotally connected at both ends so that it may pivot as rod **109** extends and pivot bar **100** turns about pivot **104**. Jack **108** is similar to jack **66** described above with the exception that jack **108** is of smaller size and horizontally oriented. Jack **108** is controlled by a conventional switch mechanism in conventional fashion, as known by those skilled in the art.

EMBODIMENT OF FIGS. 4–5

In the embodiment shown in FIGS. **4** and **5**, a barbell exercise rack **10***b* is shown similar to that of the embodiment shown in FIGS. **1–3**. Barbell exercise rack **10***b* includes a support base **12**, support stands **14**, cantilever arms **16**, barbell racks **18** and vertical adjustment mechanisms **20** identical to those of exercise rack **10***a* shown in FIGS. **1–3**. Exercise rack **10***b* differs from exercise rack **10***a* in that a horizontal adjustment mechanism **22***b* is utilized that differs from horizontal adjustment mechanism **22***a*.

As shown in FIGS. **4** and **5**, slide plates **52** are shifted by a pair of threaded, rotating screws **120**. An electrical motor and gear reducer **122** are mounted on support plate **42** to drive screws **120**. Motor **122** is controlled by a suitable switch mechanism of conventional design known to those skilled in the art. Screws **120** extend from opposite ends of motor and gear reducer **122** and are received through a channel through each bracket **38**. Screw rods **120** are generally parallel to guide rods **40** and are each threadably received in a threaded channel **124** (FIG. **4**) within track guide **54** on the underside of each slide plate **52**. As motor **122** is activated, screws **120** are turned so as to simultaneously shift slide plates **52** along guide rods **40**.

EMBODIMENT OF FIGS. 6–8

In the embodiment shown in FIGS. **6–8**, barbell exercise rack **10***c* is a single post device. Support base **12** includes a pair of laterally spaced floor runners **130** each having a partially tapered front end **132**. A joining cross bar **134** (FIG. **6**) is welded between the rear ends of floor runners **130** and a cross bar **136** is welded between floor runners **130** intermediate cross bar **134** and tapered front ends **132**. As shown in FIG. **7**, a bracket **138** is welded intermediate runners **130** so as to extend between cross bar **134** and support stand **14***c*. A pair of wheels **140** are mounted to the rear of opposite ends of cross bar **134** by brackets **142**. Wheels **140** are raised a slight distance above the floor surface and are used in the transport of exercise rack **10***c*.

As shown in FIGS. **7** and **8**, support stand **14***c* includes a rectangular post **150** that is welded to cross bar **136** so as to stand generally upright at a location intermediate floor runners **130**. A motor bracket **160** (FIG. **7**) is mounted on bracket **138** that is used in the mounting of vertical adjustment mechanism **20***c*. A rectangular, elongated tube **162** is telescopingly received over rectangular post **150** and includes an internal channel of a size to slide easily along post **150** without excessive play. Extending to the rear of the upper portion of tube **162** is mounting bracket **164** complementary to mounting bracket **160**. An electrically operated mechanical jack **166** is mounted between brackets **160** and **164** which may be one of various suitable, conventional types. One such electromechanical jack is described above relative to the double upright embodiment, jack **66**. Jack **166** includes a motor and suitable gear reducer **168** as well as an elongated rod **170** which is slidably received within casing **166** so as to be threadably driven by motor **168**. Motor **168** includes a suitable switch control mechanism for adjustment of the height of rod **170**. The upper end of tube **62** projects above arms **16** and has an upwardly, rearwardly angled surface **174** so that the sharp forward corner of tube **62** is removed.

As shown in FIGS. **6** and **8**, extending in cantilever fashion to either side of tube **162** is a cross beam **175**. Welded between the underside of each cross beam **175** and tube **162** is a gusset **176**, while each cross beam **175** terminates at its outer end with a clevis **177** that is used to pivotally connect cantilever arms **16**. Arms **16** extend forward of clevis **177** to pivot in a common horizontal plane. At the outer end of each arm **16** is an upright arm **178** that is reinforced by a gusset **179** (FIG. **7**) extending between upright arm **178** and cantilever arm **16**.

Connected to the top of each upright arm **178** is a barbell rack **18** used to support barbell **17**. Barbell rack **18** includes a block **180** that has an opposed pair of beveled surfaces **182** (FIG. **7**) similar to beveled surfaces **82**, on which are rotatably mounted a pair of cylindrical rollers **184**. A triangular guide plate **186** has an angled top side **188** and a leading edge **190** that are configured to conform to the profile of rearmost roller **184** and to provide a surface that guides the barbell onto the supporting area between rollers **184**.

As shown in FIG. **6**, cantilever arms **16** are pivotally mounted to clevises **177** at a pair of pivots **200**. Cantilever arms **16** are otherwise unsupported along the portion extending forward of pivot **200** so as to avoid any interference with the placement of a weight lifter's hands upon barbell **17**. Cantilever arms **16** extend rearward of pivot **200** and each include an inwardly extending arm or flange **202** that gives each arm **16** an overall

"L" configuration in plan view. Inward extending arms **202** are used in the converging and separating of barbell racks **18** as described below.

Mounted on the rear of tube **162** at the joint with cross beams **175** is a rearwardly extending electrically operated mechanical jack **210** (FIGS. **6–7**). Jack **210** also may be any of a variety of known jacks, such as the type described above for jack **66**. Jack **210** has a rod **212** that is joined to a perpendicular joining bracket **214**, FIG. **6**. A pair of connecting rods **216** are pivotally connected to opposite ends of bracket **214** and are each pivotally connected to the innermost end of one of the inwardly extending arms **202**. Connecting rods **216** include suitable bushings at the connection with bracket **214** and inwardly extending arm **202** so that connecting rod **216** may pivot freely at either end. So connected, as rod **212** is extended from jack **210**, joining bracket **214** draws connecting rods **216** rearward. Connecting rods **216** pivot in turn and draw rearward the innermost ends of inwardly extending arms **202**, causing cantilever arms **16** to pivot at pivots **202** and thus converge barbell racks **18**. Mounted on tube **162** above and parallel to jack **210** is a guide tube **220**. A guide post **222** is connected to rod **212** by bracket **224** (FIG. **7**) and is slidably received within tube **220**. Guide tube **220** and sliding post **222** maintain jack **210** and rod **212** in horizontal alignment as jack **210** is activated in order to accurately position barbell racks **18**.

OPERATION

Prior to commencing a lift, a weight lifter adjusts barbell racks **18** to the desired position through operation of vertical adjustment mechanism **20** and horizontal adjustment mechanism **22** in order to obtain both the proper height and spacing of barbell racks **18**.

In the operation of exercise rack **10***a*, shown in FIGS. **1–3**, either vertical adjustment mechanism **20** or horizontal adjustment mechanism **22** may be adjusted independently. In order to adjust the height of racks **18**, motors **68** are simultaneously activated by a common switch mechanism (not shown). When activated, motors **68** rotate the threaded shaft within jack casings **66**, raising or lowering rods **70** simultaneously. As rods **70** rise, tubes **62** simultaneously rise on posts **50**, thereby raising cantilever arms **16** and racks **18**. Similarly, when rods **70** are lowered, racks **18** are also lowered. Since telescoping stands **14** are adjusted by the electromechanical actuator, tube **62** is positively, rigidly held in the desired position. Any slippage problems associated with hydraulic or other actuators are avoided. However, a hydraulic actuator or the like could alternatively be used to adjust the height of stands **14** in place of jacks **66**, but an electromechanical jack is preferred. An electromechanical jack is particularly preferable when exercise rack **10***a* is to be used to support very large weights and the danger of slippage is thus increased.

In order to adjust the lateral spacing of racks **18**, jack **108** is activated. As shown in FIG. **1**, slide plates **52** and racks **18** are in a fully outwardly extended position. As jack **108** extends rod **109**, pivot bar **100** is pivoted counterclockwise in the direction of arrow A. As pivot bar **100** pivots, its outer ends move away from floor runners **30**, causing connecting rods **106** to draw slide plates **52** toward central pivot **104**. Slide plates **52** slide along guide rods **40** on track guide **54** causing arms **16** to converge in the direction of arrows B shown in FIG. **1** until racks **18** reach the desired spacing. As racks **18** are adjusted laterally, rollers **84** roll along the length of the supported barbell in order to avoid any skidding or jamming which may be experienced with large weights. It will be noted that as cantilever arms **16** are laterally adjusted, cantilever arms **16** remain parallel throughout.

In order to access the supported barbell **17**, the weight lifter aproaches exercise rack **10***a* from the front and positions himself between floor runners **30**. Floor runners **30** are sufficiently widely spaced and extend far enough forward of cross bar **36** to accommodate a full range of weight lifting foot placements without interference. The weight lifter grips barbell **17** in the desired manner, and may make last minute adjustments of the placement of racks **18**. Racks **18** permit barbell **17** to be lifted freely therefrom, and guide barbell **17** back onto rollers **84** as the barbell is lowered. While barbell **17** is being lowered, if it is held too closely to support stand **14**, the barbell will contact guide plates **86** and slide down angled sides **88** until it is firmly seated on rollers **84**.

As shown in FIGS. **1–2**, floor runners **30** extend farther forward of support stand **14** than do racks **18**. The center of gravity of exercise rack **10***a* and the supported barbell **17** will therefore always remain rearward of the tapered front ends **32** of floor runner **30** and prevent exercise rack **10***a* from inadvertently tipping over, even if a great weight is dropped onto racks **18**. Thus, additional weights are not required to be added to stand **12** to stabalize exercise rack **10***a*. Additionally, since elongated tube **62** slides over post **50**, even if jacks **66** fail, barbell **17** will be prevented from falling onto the weight lifter when tubes **62** contact slide plates **52**.

Although jacks **66** are normally operated simultaneously to maintain arms at a common height, jacks **66** may be operated independently in a conventional fashion in order to individually adjust the height of arms **16** under certain circumstances. For instance, if support base **12** is not resting upon a level surface, one support stand **14** could be raised slightly in order to level racks **18**.

In the operation of exercise rack **10***b*, shown in FIGS. **4** and **5**, racks **18** are adjusted vertically in the same manner as that of exercise rack **10***a*. In order to laterally adjust racks **18**, motor **122** is activated and threaded rods **120** are simultaneously rotated. Threaded rods **120** turn in threaded channels **124** within the track guides **54** under slide plates **52**, causing slide plates **52** to converge in the direction of arrows B (FIG. **4**) or separate as desired. The weight lifter may then access barbell **17** in the same manner as described above.

It will be noted that in both of the embodiments of exercise rack **10***a* and **10***b*, support stands **14** provide a substantially unobstructed area in front of the weight lifter as he faces the rack. In the event that the weight lifter cannot finish his lift and must drop the weight, he may fall forward in order to clear the falling barbell without hindrance from the exercise rack. The dropped barbell **17** will then either fall behind the weight lifter, in front of racks **18**, or will land on cantilever arms **16** and be prevented from rolling off by the upper portion of tubes **62** and guide plates **86**.

In the operation of exercise rack **10***c*, shown in FIGS. **6–8**, the single motor **168** is activated in order to adjust the height of racks **18**. Rod **170** is raised or lowered as desired, causing tube **162** to raise or lower on post **150**. This in turn adjusts the height of cantilever arms **16** and therefore the height of racks **18** supported thereon.

As shown in FIG. **6**, racks **18** are in a laterally, fully separated position with cantilever arms **16** parallel and

rod **212** of jack **210** fully retracted. In order to converge racks **18**, jack **210** is activated to extend rod **212**. As rod **212** and connected joining bracket **214** are extended, connecting rods **216** draw the inner ends of inward arms **202** rearward from cross beams **175** as shown in phantom in FIG. **6**. The "L" shaped configuration of arms **16** cause arms **16** to pivot at pivots **200** and thus converge racks **18** in the direction of arrows C (FIG. **6**). As rod **170** extends rearward, sliding guide post **222** slides out of guide tube **220** and maintains rod **170** in proper alignment.

Since exercise rack **10***c* is equipped with wheels **140**, rack **10***c* may be transported by lifting the front of rack **10***c* in order to tilt the rack back onto wheels **140**.

Although exercise rack **10** in its various embodiments as described above and shown in the drawings is dimensioned primarily for the execution of squat lifts, by the elongation or further telescoping of support stand **14** various other weight lifting exercises could be performed with exercise rack **10**. If support stand **14** is raised, exercise rack **10** may be used to perform standing military presses, french curls or the like. If support stand **14** is lowered sufficiently, exercise rack may be used to perform standard curls, or combined with a bench to perform bench pressing or the like.

From the foregoing description, it will be readily appreciated by those skilled in the art that modifications or improvements may be made to the embodiments without departing from the spirit of the invention disclosed herein. The scope of the protection provided is to be determined by the claims which follow and the breadth of interpretation which the law allows.

The embodiments of the invention in which an exclusive property or privilege is claimed are as follows:

1. A barbell exercise rack, comprising:

a support base;

a support stand secured to said support base, and upstanding therefrom in a generally vertical orientation;

first and second support arms, having inner and outer ends, and being spaced apart laterally a distance sufficient to accommodate a weight lifter bodily positioned therebetween; said support arms having the inner ends thereof connected with said support stand, extending outwardly therefrom along a generally horizontal orientation, and being wholly supported in a cantilevered fashion by said support stand; the outer ends of said support arms having racks connected therewith adapted for selectively holding and supporting a barbell thereon a spaced apart distance from said support stand, while allowing the barbell to be lifted freely therefrom;

said arms are pivotally mounted to said support stand at associated pivot points, said arms pivoting about respective ones of said pivot points in a generally horizontal plane;

means for mechanically converging and diverging the outer ends of said support arms, and thereby adjusting the lateral position of said racks with respect to the barbell to accommodate various weight lifters; and

said converging and diverging means including means for selectively pivoting said arms about said pivot points to converge and diverge said outer ends.

2. The barbell exercise rack of claim **1** wherein said support arms are substantially commensurate in length, and said support base includes a pair of legs extending in the same direction as said support arms, and being spaced laterally apart a distance sufficient to permit a weight lifter to freely ambulate therebetween and access the barbell; said base legs having a length at least as great as the length of said support arms for stability.

3. The barbell exercise rack of claim **2**, wherein said support stand includes a single, generally vertically telescoping upright; said upright having a cross bar connected with an upper member of said telescoping upright on which said support arms are pivotally mounted.

4. The barbell rack of claim **3** wherein said racks include rollers on which the barbell is supported to facilitate lateral adjustment of said support arms without removing the barbell from said racks.

5. The barbell exercise rack of claim **4**, wherein said support stand includes means for mechanically adjusting the vertical position of said racks.

6. The barbell exercise rack of claim **5**, wherein said vertical adjusting means comprises an electrically powered ball and screw motor, whereby the height of said racks is automatically and securely locked into position when said motor is deactivated.

7. A barbell exercise rack, comprising:

a support base, said support base including a laterally extending track with first and second carriages slidably mounted on opposite sides thereof;

a support stand secured to said support base, and upstanding therefrom in a generally vertical orientation;

first and second support arms, having inner and outer ends, and being spaced apart laterally a distance sufficient to accommodate a weight lifter bodily positioned therebetween; said support arms having the inner ends thereof connected with said support stand, extending outwardly therefrom along a generally horizontal orientation, and being wholly supported in a cantilevered fashion by said support stand; the outer ends of said support arms having racks connected therewith adapted for selectively holding and supporting a barbell thereon a spaced apart distance from said support stand, while allowing the barbell to be lifted freely therefrom;

said support stand comprising first and second uprights mounted to and upstanding from said first and second carriages respectively, with said arms being supported on upper ends of said uprights, whereby said support stand supports the barbell on opposite sides thereof, and is open at the front and back to avoid contact with and injure the lifter in the event that he is overcome by the weight of the barbell; and

means for mechanically converging and diverging the outer ends of said support arms, and thereby adjusting the lateral position of said racks with respect to the barbell to accommodate various weight lifters.

8. The barbell exercise rack of claim **7** wherein:

said support arms are substantially commensurate in length, and said support base includes a pair of legs spaced laterally apart a distance sufficient to permit a weight lifter to freely ambulate therebetween and access the barbell; said base legs having a length at least as great as the length of said support arms for stability.

9. The barbell exercise rack of claim **8**, wherein said racks include rollers on which the barbell is supported

to facilitate lateral adjustment of said support arms without removing the barbell from said racks.

10. The barbell exercise rack of claim **9**, wherein said support stand includes means for mechanically adjusting the vertical position of said racks.

11. The barbell exercise rack of claim **10**, wherein said vertical adjustment means comprises an electrically powered ball and screw motor operably connected to each upright, whereby the height of said jacks is automatically and securely locked into position when said motor is deactivated.

12. A barbell exercise rack, comprising:

a support base, having first and second, laterally spaced apart legs which define an unobstructed floor area therebetween and said base having a joining portion between said legs;

a support stand secured to said support base, and upstanding therefrom in a generally vertical orientation, said support stand including a single telescoping upright element and a means for selectively, adjustably varying the height of said telescoping upright element and said arms therewith;

first and second laterally spaced apart support arms connected with an upper end of said support stand in a cantilever fashion and extending outward therefrom in a generally horizontal orientation;

said support arms each including a rack positioned adjacent to the free end of the associated support arm adapted for selectively holding and supporting a barbell, while allowing the barbell to be freely lifted therefrom, said arms being laterally adjustable so as to converge and diverge said racks;

said racks being disposed in a common vertical plane, and said legs each including a generally horizontally oriented floor runner extending from said joining portion, said floor runners extending from said joining portion a distance greater than the distance said vertical plane is spaced from said joining portion;

said support arms being spaced laterally apart a distance sufficient to permit a weight lifter to freely ambulate therebetween into the unobstructed floor area and access the barbell; and

means for simultaneously adjusting the height of both of said arms to accommodate an individual weight lifter.

13. The barbell exercise rack of claim **12**, wherein said racks include means for rolling along and supporting said barbell while said racks are converged and diverged.

14. A barbell exercise rack, comprising:

a support base, having first and second, laterally spaced apart legs which define an unobstructed floor area therebetween and said base having a joining portion between said legs;

a support stand secured to said support base, and upstanding therefrom in a generally vertical orientation;

first and second laterally spaced apart support arms connected with an upper end of said support stand in a cantilever fashion and extending outward therefrom in a generally horizontal orientation, said support arms being spaced laterally apart a distance sufficient to permit a weight lifter to freely ambulate therebetween into the unobstructed floor area;

said support arms each including a rack positioned adjacent to the free end of the associated support arm adapted for selectively holding and supporting a barbell, while allowing the barbell to be freely lifted therefrom, said racks being disposed in a common vertical plane, and said legs including generally horizontally oriented floor runners extending from said joining portion, said floor runners extending from said joining portion a distance greater than the distance said vertical plane is spaced from said joining portion;

means for simultaneously adjusting the height of both of said arms to accommodate an individual weight lifter, said both arms simultaneous height adjusting means includes said support stand having two spaced telescoping upstanding elements each having a support arm associated therewith, and means for selectively, adjustably varying the height of said telescoping upright elements; and

means for selectively, laterally adjusting said racks, said horizontal adjustment means being disposed within said base so that the area between said upright elements above said base is substantially unobstructed.

15. The barbell exercise rack of claim **14**, wherein said racks include means for rolling along and supporting a barbell thereon as said racks are separated and converged.

16. A barbell exercise rack, comprising:

a support base which includes a laterally extending track with first and second carriage slidably mounted on opposite sides thereof;

first and second uprights mounted to and upstanding from said first and second carriages respectively;

said uprights each having a rack connected therewith adapted for selectively holding and supporting a barbell thereon, while allowing the barbell to be lifted freely therefrom; and

means for simultaneously, selectively converging and diverging said uprights and thereby adjust the lateral position of said racks with respect to the barbell to accommodate various weight lifters, said converging and diverging means interlinking said uprights and being disposed within said base so that the area between said uprights above said base is substantially unobstructed at both the front and the back to permit unobstructed passage of a weight lifter therethrough in the event that he is overcome by the weight of the barbell and must remove himself from beneath the barbell.

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